

REMARKS

By this amendment, claims 1, 6, 13, 16, 18-21, 24, 26, 29, 32, 33 and 42 are amended. Claims 2, 3, 8-12, 14, 15, 23 and 34-41 have been previously cancelled. Accordingly, claims 1, 4-7, 13, 16-22, 24-33 and 42 are currently active in this application, of which claims 1, 13, 19 and 42 are independent. Applicant respectfully submits that the above amendments do not add new matter to the application and are fully supported by the specification.

Entry of this Amendment is respectfully requested because it places the present application in condition for allowance, or in the alternative, better form for appeal. In view of the above Amendments and the following Remarks, Applicant respectfully requests reconsideration and withdrawal of the objections and rejections for the reasons discussed below.

Claim Status

The Office Action Summary (PTOL-326) indicates that claims 26-33 are rejected, but the Detailed Action does not include any ground for the rejection for claims 26-33. Clarification is respectfully requested in the next Office Action.

Rejection of Claims under 35 U.S.C. §103

Claims 1, 4-7 and 42 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 6,433,842 issued to Kaneko, et al. ("Kaneko") in

view of U. S. Patent No. 4,181,564 issued to Fogarty , et al. ("Fogarty"). Applicant respectfully traverses this rejection for at least the following reasons.

With respect to claims 1 and 4-7, Applicant previously pointed out that, in Kaneko, (a) a contact hole formed in the passivation layer 10 does not expose the aluminum alloy layer 8, and (b) the ITO pixel electrode 11 does not directly contact the aluminum alloy layer 8.

In this regard, the Examiner took the position that the combination of the aluminum alloy layer 8 and the molybdenum alloy layer 9 corresponds to the claimed wire formed of an aluminum-based material. On this basis, the Examiner asserted that (a) Kaneko discloses the contact hole formed in the passivation layer 10 exposing the combination of the aluminum alloy layer 8 and the molybdenum alloy layer 9, and (b) the ITO pixel electrode 11 directly contacts the combination of the aluminum alloy layer 8 and the molybdenum alloy layer 9. This assertion is respectfully disagreed with.

To clarify the differences between the claimed invention and the cited references, in this response, independent claim 1 has been amended to recite:

"1. A method for manufacturing a contact structure, comprising steps of:
forming a first conductive layer formed of an aluminum-based material;
depositing a silicon nitride layer at a temperature between about 280° C and about 400° C;
forming a contact hole extending through the silicon nitride layer and exposing the first conductive layer; and
forming a second conductive layer formed of indium zinc oxide (IZO) and directly contacting the first conductive layer through the contact hole." (Emphasis Added)

According to claim 1, (a) the first conductive layer is formed of an aluminum-based material, (b) the contact hole is formed to expose the first conductive layer, and (c) the second conductive layer is formed to directly contact the first conductive layer.

In this regard, as previously argued, in Kaneko, the contact hole formed in the passivation layer 10 exposes the molybdenum alloy layer 9, but does not expose the aluminum alloy layer 8. Also, the ITO pixel electrode 11 directly contacts the molybdenum alloy layer 9, does not directly contact the aluminum alloy layer 8. Thus, Kaneko fails to disclose or suggest “forming a contact hole ... exposing the first conductive layer” and “forming a second conductive layer ... directly contacting the first conductive layer through the contact hole”, as claimed.

For these reasons, it is submitted that claim 1 is patentable over the cited references. Claims 4-7 are dependent from claim 1 and hence would also be patentable at least for the same reasons.

Independent claim 42 is also amended to clarify the difference between the claimed invention and the cited references. Amended independent claim 42 recites:

“42. A method for manufacturing a contact structure, comprising steps of:
 depositing a first conductive layer formed of aluminum on a substrate;
 patterning the first conductive layer to form a signal line;
 depositing a silicon nitride layer on the signal line at a fixed temperature between about 280° C and about 400° C;
 forming a contact hole extending through the silicon nitride layer and exposing the signal line; and
 forming a second conductive layer formed of indium zinc oxide (IZO) and directly contacting the signal line through the contact hole.” (Emphasis Added)

According to claim 42, (a) the first conductive layer is formed of aluminum, (b) the contact hole exposes the signal line formed by patterning the first conductive layer, and 9c) the second conductive layer directly contacts the signal line. As mentioned above, the cited references fail to disclose or suggest these claimed features. Thus, it is submitted that claim 42 is patentable over them.

Accordingly, Applicant respectfully requests withdrawal of the 35 U.S.C. §103(a) rejection of claims 1, 4-7 and 42.

Claims 13 and 18-22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 6,163,356 issued to Song, et al. ("Song") in view of Kaneko, and further in view of Fogarty. Applicant respectfully traverses this rejection for at least the following reasons.

With respect to claims 13 and 18, in this response, independent claim 13 has been amended to clarify the differences between the claimed invention and the cited references. Amended independent claim 13 reads:

"13. A method for manufacturing a thin film transistor (TFT) array panel, comprising steps of:
 depositing a first conductive layer formed of an aluminum-based material on a substrate;
 patterning the first conductive layer to form a gate line and a gate pad connected to the gate line;
 depositing a silicon nitride layer on the gate line and a gate pad at a temperature between about 280° C and about 400° C;
 forming a semiconductor layer on the silicon nitride layer;
 depositing a second conductive layer on the semiconductor layer;

patterning the second conductive layer to form a data line;
forming a contact hole extending through the silicon nitride layer and exposing the gate pad;
depositing a third conductive layer formed of an indium zinc oxide (IZO) layer; and
patterning the third conductive layer to form a conductive pattern directly contacting the gate pad in the contact hole.”

According to claim 13, (a) the gate pad is formed of an aluminum-based material, (b) the contact hole formed in the silicon nitride layer exposes the gate pad, and (c) the conductive pattern is formed by patterning the IZO layer and directly contacts the gate pad.

In this regard, as mentioned in the previous response, Song also fails to disclose or suggest this claimed feature. As shown in Fig. 4b of Song, the aluminum gate pad 15a is completely covered by the non-aluminum gate pad 15 because “the gate pad 15a using aluminum [has] a tendency to form hillocks on their surface.” (Song, column 4, lines 38-50). Fig. 4e of Song shows the contact hole 59 formed through the insulating layer 17 and exposing the non-aluminum gate pad 15. However, the contact hole 59 does not expose the aluminum gate pad 15a. Fig. 4f of Song shows the gate pad connecting terminal 57 directly contacting the non-aluminum gate pad 15, but the gate pad connecting terminal 57 does not directly contact the gate pad 15a.

Thus, Kaneko does not disclose or suggest (a) the gate pad formed of an aluminum-based material, (b) the contact hole formed in the silicon nitride layer and exposing the gate pad, and (c) the conductive pattern formed by patterning the IZO layer and directly contacting the gate pad. Since none of the cited references discloses or suggests these claimed features, it is submitted that claim 13 is patentable over them.

Claim 18 is dependent from claim 13 and hence would also be patentable at least for the same reason.

With respect to claims 19-22, independent claim 19 has been amended to clarify the difference between the claimed invention and the cited references. Amended independent claim 19 recites:

“19. A method for manufacturing a thin film transistor array panel, comprising steps of:
depositing a first conductive layer formed of an aluminum-based material on a substrate;
patterning the first conductive layer to form a gate line, a gate electrode and a gate pad;
depositing a silicon nitride layer at a temperature between about 280° C and about 400° C;
forming a semiconductor layer on the silicon nitride layer;
depositing a second conductive layer over the silicon nitride layer and the semiconductor layer;
patterning the second conductive layer to form a data line, a source electrode and a drain electrode;
forming a passivation layer over the silicon nitride layer and the data wire;
forming a contact hole extending through the passivation layer and the silicon nitride layer and exposing the gate pad;
depositing a third conductive layer formed of an indium zinc oxide (IZO) layer over the passivation layer; and
patterning the third conductive layer to form a redundant gate pad directly contacting the gate pad through the contact hole.”

According to claim 19, (a) the gate pad is formed by patterning the first conductive layer formed of an aluminum-based material, (b) the contact hole formed in the passivation layer exposes the gate pad, and (c) the redundant gate pad is formed by patterning the third conductive layer and directly contacts the gate pad.

As mentioned above, none of the cited references discloses or suggests these claimed features. Thus, it is submitted that claim 19 is patentable over them. Claim 20-22 are dependent from claim 19 and hence would also be patentable at least for the same reasons.

Accordingly, Applicant respectfully requests withdrawal of the 35 U.S.C. §103(a) rejection of claims 13 and 18-22.

Claims 16, 17, 24 and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Song in view of Kaneko, and further in view of Fogarty, and further in view of U. S. Patent No. 6,399,222 issued to Araia, et al. ("Arai"). Applicant respectfully traverses this rejection for at least the following reasons.

Claims 16 and 17 are dependent from independent claim 13. As mentioned above, claim 13 has been amended and is now believed to be patentable over Song, Kaneko and Fogarty because, for example, none of these references discloses or suggests (a) the gate pad formed of an aluminum-based material, (b) the contact hole formed in the silicon nitride layer and exposing the gate pad, and (c) the conductive pattern formed by patterning the IZO layer and directly contacting the gate pad, as claimed.

Arai is directed to forming a silicon oxide barrier between an alkali glass substrate and an organic EL structure, but does not cure the deficiency of Song, Kaneko and Fogarty. Thus, claim 13 is patentable over the cited references. Dependent claims 16 and 17 would also be patentable at least for the same reasons.

Claims 24 and 25 are dependent from independent claim 19. As mentioned above, claim 19 has been amended to recite that (a) the gate pad is formed by patterning the first conductive layer formed of an aluminum-based material, (b) the contact hole formed in the passivation layer exposes the gate pad, and (c) the redundant gate pad is formed by patterning the third conductive layer and directly contacts the gate pad.

As mentioned above, none of the cited references discloses or suggests these claimed features. Thus, claim 19 is patentable over the cited references. Dependent claims 24 and 25 would also be patentable at least for the same reasons.

Accordingly, Applicant respectfully requests withdrawal of the 35 U.S.C. §103(a) rejection of claims 16, 17, 24 and 25.


Conclusion

Applicant believes that a full and complete response has been made to the Office Action and respectfully submits that all of the stated objections and grounds for rejection have been overcome or rendered moot. Accordingly, Applicant respectfully submits that all pending claims are allowable and that the application is in condition for allowance.

Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact the Applicant's undersigned representative at the number below to expedite prosecution.

Prompt and favorable consideration of this Reply is respectfully requested.

Respectfully Submitted,


Hae-Chan Park
Registration No. 50,114

Date: October 21, 2005

McGuireWoods LLP
1750 Tysons Boulevard
Suite 1800
McLean, VA 22102-4215
Tel: 703-712-5365
Fax: 703-712-5280
HCP:WSC/tmf

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